



TIDBITS

tips and helpful links

Math Talk...

Assessment -

It's important for students to be familiar with questioning formats used in assessment. Posing math questioning in a variety of ways during instruction prepares students for the varied presentations they may encounter during assessments.

Students with disabilities benefit from text accompanied by visual presentations. As you utilize the math practice items (<https://www.ideal.azed.gov/p/aims>) in preparation for the AIMS assessment, spend some additional time on those items that provide visuals as part of the question. Teaching students to understand and utilize these will give them the strategies they'll need for effective problem solving.

Problems such as the following example from the Grade 5 Math Sample Test illustrate the expectation for fluency and generalization in working with fractions, decimals, and percents: (<https://www.ideal.azed.gov/p/aims>)

To place 0.67, $\frac{3}{4}$, and 34% in order from least to greatest, John changes $\frac{3}{4}$ to 0.75 and 34% to 0.34. Then he uses the three decimals to correctly place the original numbers in order from least to greatest: 34%, 0.67, $\frac{3}{4}$. Which problem is best solved by using this same strategy?

A) What is 80% of 75? B) What is the sum of $(4 + \frac{1}{5}) + \frac{2}{5}$? C) What is the solution to $100 - 0.73$?

D) What symbol completes the inequality $0.70 \{ \} \frac{4}{5}$?



Fractions in the Big Picture -

The Common Core Standards recognize the need for greater math proficiency leading to college and career readiness. To that end, the groundwork must be established for students to successfully complete Algebra II in high school. In the National Mathematics Advisory Panel's final report, the following recommendations were made to prepare students for that task:

- Proficiency with whole numbers, fractions, and particular aspects of geometry and measurement should be understood as the Critical Foundations of Algebra.
- Emphasis on these essential concepts and skills must be provided at the elementary and middle grade levels.
- The coherence and sequential nature of mathematics dictate the foundational skills that are necessary for the learning of algebra. The most important foundational skill not presently developed appears to be proficiency with fractions (including decimals, percent, and negative fractions). The teaching of fractions must be acknowledged as critically important and improved before an increase in student achievement in algebra can be expected.

<http://www2.ed.gov/about/bdscomm/>

It is highly recommended that number lines be employed when teaching fractions and decimals to provide a visual Reference.

(*Beyond Pizzas & Pies* by Julie McNamara and Meghan M. Shaughnessy).

In addition, problems set in a real world context makes the content comprehensible.

Making Math Accessible -

Use your resources! Include your special area teachers in your grade level planning (PLC). Explore how the math concepts can be reinforced during music, PE, and art. Students will delight in finding fractions in musical notes, geometry in origami, perimeter and area in PE – the possibilities are endless...check out this site for some great ideas on integrating math and the arts:

http://www.sedl.org/pubs/classroom-compass/cc_v4n2.pdf

Take it a step further and hold a school-wide math fair. This is a great opportunity to involve whole families in math awareness and education. Everything from food preparation, transportation, budgeting, crafts, sports, and nature have math components. Each grade level could develop a theme and present it in a fun and interesting way.

Daily Instruction -

Getting the answer is only the beginning!

Ask “Why?”, “How do you know?”, and “Can you explain?” as a routine part of instruction.

The Common Core calls for students to be able to explain and justify their responses.

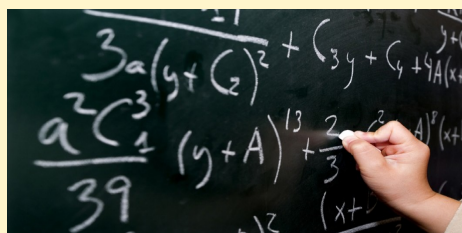
As students explain, peers can evaluate their methods, realizing that problems can be approached from different perspectives, that some methods may be more efficient than others, and that they can learn from each other. Multiple representations will help ensure that everyone “gets it” and it gives you a window into how your students are thinking.

“Sponge” activities at the beginning of class give the teacher an opportunity to check how well students have maintained skills previously taught. A mixture of problem types dealing with operations, conversions, facts, or estimating keep skills sharp throughout the year. This provides engagement from the first minutes of class as the teacher performs routine tasks like checking attendance and homework completion.

Characteristics of an effective math classroom include:

- Probing questions regarding procedures, alternative approaches, and the reasonableness of responses.
- Justification of answers, even when they are correct.
- During homework review, the focus is on explaining and understanding, not just the right answers.

Source: Accessible Mathematics by Steven Leinwand



Daily Instruction:

Teaching math in context and helping students make connections is critical for understanding of concepts. The following example illustrates how teachers can make math meaningful and relevant for middle school students:

Looking At An Angle: The Mathematics in Context curriculum is designed so that lessons begin with a meaningful context and the math is extracted from that context. The context here involves a ladder positioned against a building, what it does, and for whom and when would a ladder be needed. The class moves outside where they help the school janitor position a ladder. By directing the positioning of the ladder, students see and describe how the angles and distances made by the ladder change when the ladder moves from an unstable position to a safe and stable position- underscoring the mathematical focus of this lesson - the tangent ratio. Back in the classroom, students draw triangles representing the ladder against the wall and examine the relationships amongst distance, height, and angles of the resulting triangles. They discover that the height-to-distance ratio is a measure of steepness affected by the size of an angle. The lesson culminates with students plotting a steepness graph to determine the necessary height-to-distance ratio for a ladder to be safe and stable. Check the following website for more great ideas for teaching math in middle school: Source: <http://mmmproject.org/mic.htm>

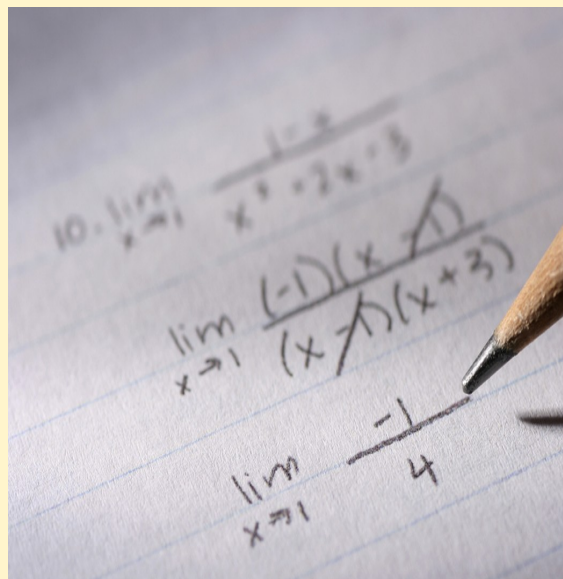
Do you have English Language Learners in your math class? Check this site for some ideas on how to make the math comprehensible for students at various levels of language acquisition:

http://txcc.sedl.org/resources/ell_materials/mell/index.html

<http://www.mathwire.com/> is a site where teachers share theme-based math activities – all free for classroom teachers.

Do your students really understand the meaning of the equal sign (=)? Check out this website for some ideas to clarify that essential concept for getting your students “algebra ready”.

<http://www.sedl.org/pubs/sedl-letter/v15n01/5.html>



How confident are you in your own math skills? Many teachers lack the depth of understanding necessary to teach math effectively because of limited exposure in K-12 education and teacher preparation classes. This site has numerous suggestions for getting up to speed:

http://www.sedl.org/pubs/classroom-compass/cc_v5n3.pdf

Vocabulary Development -

Students need to have a good command of math vocabulary as well. This site: <http://www.k-5mathteachingresources.com/math-vocabulary.html> discusses the importance of linking new math vocabulary to prior knowledge and to represent those new words in context (such as a math notebook utilizing graphic organizers) to solidify their meanings. Building math word walls keep the terms accessible as you utilize them in instruction.

Positive Attitude -

Developing and maintaining a positive “can do” attitude about math is critical for success. The Common Core, with its increased rigor, sets the expectation that students will persevere in working through difficult math problems. Teachers



Math Fluency -

The Common Core Standards call for automaticity of math facts. Spending just a few minutes each day on timed tests will help bring these skills to the automatic level and maintain them. Another strategy is to have math facts on sets of cards hanging at the door, whenever the students leave the classroom they have to do a set before leaving. Many students with disabilities take longer to establish these in long term memory, so it's important to maintain a regular procedure for addressing these. Graphing progress in mastering these helps give students a visual of their progress, increasing self-esteem and creating more positive attitudes toward math.



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